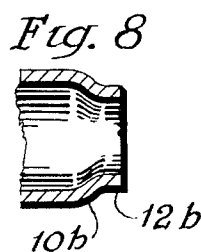
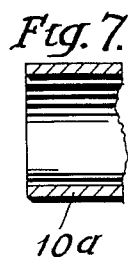
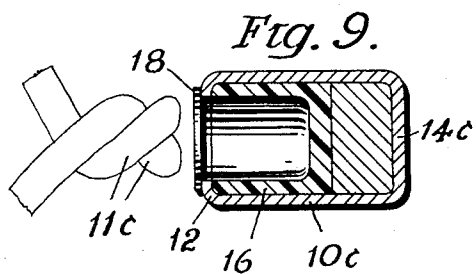
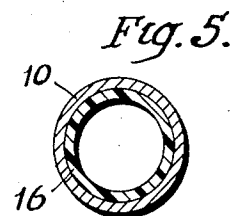
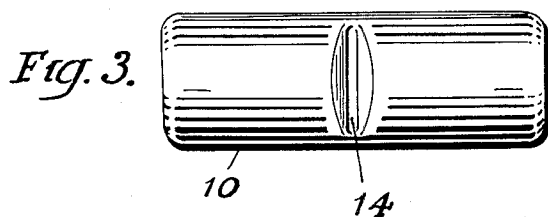
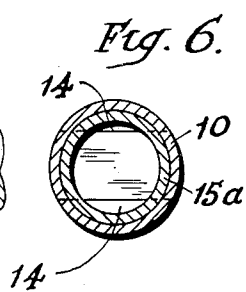
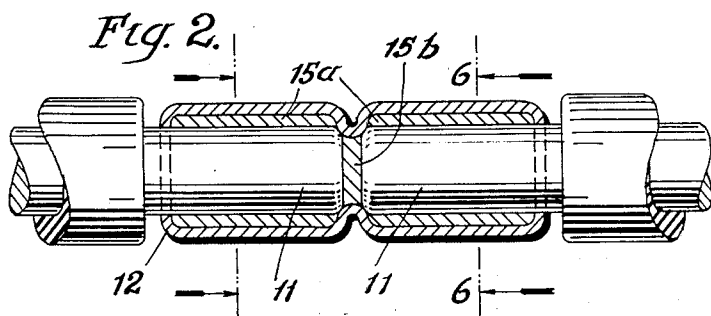
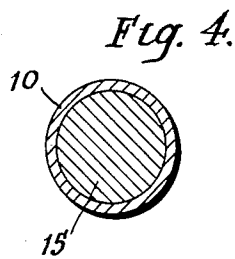
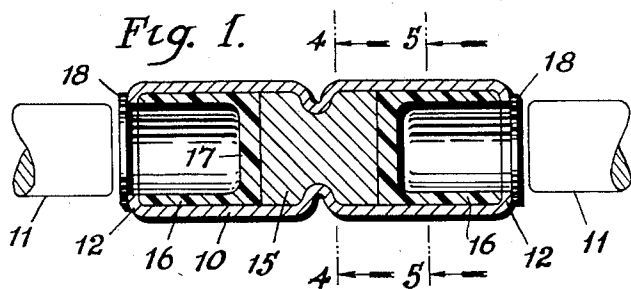


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CONNECTOR FOR ELECTRIC WIRES

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2,838,593

CONNECTOR FOR ELECTRIC WIRES

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2 Claims. (Cl. 174—84)

This invention relates to connectors and connections and to connectors and methods for connecting electric wires and making the connectors and more particularly to sleeve-like connectors wherein the wires are soldered or otherwise secured together though it is noted that in some of the claims the invention is not limited to sleeves nor even to wires. It is understood that the term "solder" as used herein includes the use of other metals or alloys with which connections may be similarly made.

Objects of the invention are to provide an improved connector or connector assembly of this kind with which strong efficient connections may be quickly and easily made with certainty by relatively unskilled workers.

Other objects of the invention are to provide an improved connector, receptacle or sleeve of this kind which is precharged and sealed against impurities, with the correct amount and shape of the solder and flux therein though the invention as defined in some of the claims is not limited to solid flux or the use of flux.

Additional objects of the invention are to effect simplicity and efficiency in such methods and devices and to provide an extremely simple connector of this kind which is durable, reliable and dependable in use and operation, and economical to manufacture and operate.

It is well known that the present methods of using separate flux and solder to make a soldered joint are considered to be a skilled art, and that it is never certain that a proper strong permanent conductive joint of the proper cross section will be made. Objects of the present inventions are to eliminate such uncertainty and insure that a proper joint will always be made, even by unskilled labor.

Still other objects of the invention will appear as the description proceeds; and while herein details of the invention are described in the specification and some of the claims, the invention as described in the broader claims is not limited to these, and many and various changes may be made without departing from the scope of the invention as claimed in the broader claims.

The inventive features for the accomplishment of these and other objects are shown herein in connection with a number of improved connectors which, briefly stated, include a heat conductive electrically conductive sleeve or receptacle open at one or both ends and having a wall or inwardly projected shoulders remote from the open end or ends. A mass of meltable solder-like material of proper size is held in the sleeve against the shoulders or wall; and a proper amount of flux material is disposed against said mass between the mass and the open end or ends. A wafer adhered over the open end seals against the entry of impurities and is adapted to be ruptured by the insertion of the wires, whereupon the sleeve may be heated to melt the flux and solder-like material to allow the wire ends to be pushed inwardly to said shoulders, there to be held until the solder-like material becomes hardened.

The terms "solder" and "soldering" as used herein are intended to cover the use of any alloy, metal or material

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having a lower melting point than the sleeve or conductors to be secured.

In the accompanying drawing showing, by way of example, several of many possible embodiments of the invention,

Fig. 1 is an axial sectional view, showing one form of the precharged sleeve-like connector before use;

Fig. 2 is a fragmental axial sectional view, partly in elevation, showing wires joined by the connector;

Fig. 3 is a side elevation or plan of the same connector;

Figs. 4, 5 and 6 are transverse sectional views partly in elevations respectively taken substantially on the lines 4—4, 5—5 of Fig. 1 and 6—6 of Fig. 2, looking in the direction of the arrows of said line;

Figs. 7 and 8 are fragmental axial sectional views of modified forms of the open ends of the connectors of Figs. 1 and 9; and

Fig. 9 is an axial sectional view showing another form of connector.

In the form of the invention as shown in Figs. 1 to 6 our improved connector for connecting electric wires comprises a sleeve 10 or receptacle of any suitable shape of cross-section, of copper or other metal or heat conducting material, preferably of as great or greater cross section than the wires 11 to be connected, and open at both ends and having small inturned flanges 12, if desired, sized to fittingly engage the wires. Opposite sides of the sleeve have inwardly pressed crimps 14 at the mid-part of the sleeve to form shoulders to limit the inward movement of the wires. A charge, shot or mass of lead 15, solder or suitable alloy held by said crimps 14 substantially fills or fits in the mid-part of the sleeve.

Charges of flux material 16 which may be hardened if desired and of outwardly open cup-shape or other shape is placed or fitted in the respective end portions of the sleeve against the mass 15 or with the bottom wall 17 of the cup-shaped charge against said mass 15, held in place by said flanges 12, if present. Wafers 18 of hardened flux, paraffin wax, or a combination of flux and paraffin, or of cellophane or other material are adhered or otherwise secured over the respective open ends to seal against the entry of impurities and are adapted to be ruptured by the insertion of the scraped ends of the wires 11 against the flux charge or into the cup-shaped charge and against the bottom thereof.

While the wire ends are thus in place any suitable heater or source of heat may be used to heat the sleeve 10 to melt the flux to clean the wire ends and melt the solder to allow the wire ends 11 to be pushed inwardly to said shoulder or crimps 14, the wires there to be held properly spaced from each other and from the sleeve by the crimps 14 and flanges 12 while the flux is held by the flanges in the sleeve until the flux boils and fluxes well the length of sleeve and wire from end to end of the side wall of the cup-shaped flux charge and the melted solder 15a surrounds the wires and disposes itself between and on the end faces of the wires and makes full electrical connection and contact with and between the wires and with and between the sleeve and wires and becomes hardened, to form a very strong permanent electrically conductive joint.

The original charge of solder is sufficient to entirely fill the clearance within the sleeve to the flange 12 when the solder is melted, as shown in Fig. 2. When the heat is applied, the flux melts and boils and builds up pressure preventing the entrance of impurities, or air, or water, if the process is under water, and is applied to the wire and inner face of the sleeve before the solder melts. When the solder melts, the wires are pushed into the crimps 14, and the solder because of its high specific gravity, pushes out at the ends of the sleeve any remaining flux, flux residue, or impurities and air, or water, if any. Some of

the flux vapor and melted flux emerge as a signal that the inside of the connector has been cleaned and the solder is ready to emerge.

The flanges 12 may be omitted if desired as shown by an end of the modified sleeve 10a of Fig. 7. Instead of the flange 12 the ends of the sleeve 10b (Fig. 8) may be of ogee shape and reduced in diameter to provide short cylindrical flange parts 12b to help hold the wires coaxial with the sleeve.

In the form of the invention as shown in Fig. 9 the connector comprises a cylindrical sleeve or receptacle 10c closed by an end wall or shoulder 14c and preferably of greater diameter than the maximum diameter of twisted ends of the wires 11c to be connected, the open ends having small inturned flanges 12, if desired, sized to engage the wires. The closed end wall 14c forms a shoulder to limit the inward movement of the wires 11c. A charge, shot or mass of lead, solder or suitable alloy 15c is disposed against the end wall 14c.

An outwardly open charge of flux material of cup-shape or other shape is placed in the open end portion of the receptacle against the mass and held in place by said flanges 12 if present. A wafer of flux or other material or mixture is secured over the open end to seal against the entry of impurities and is adapted to be ruptured by the insertion of the ends 11c of preferably twisted or untwisted wires to be connected, against the flux charge or into the cup-shaped charge.

While the twisted or untwisted wires 11c are thus in place, the receptacle 10c is heated to melt the flux and solder to allow the wires' ends 11c to be pushed inwardly to said wall 14c, there to be held properly spaced from the sleeve by the flanges 12 while the flux is held by the flanges in the receptacle until the flux boils and the solder surrounds the wires and makes full electrical contact with and between the receptacle and wires and becomes hardened. The container 10c may be formed with the open end of Fig. 7 or the reduced end 12b of Fig. 8, if desired.

The parts of any of the connectors above described may be sold separately and assembled by the user, or they may be pre-assembled as shown in Figs. 1 and 9 or with the modifications of Figs. 7 and 8 thus to provide an article of sale.

The article of sale of Fig. 1 may be made by cutting to the desired length a sleeve of copper or other metal of the same as or greater cross section than the wires to be connected, leaving the sleeve open at both ends, which may be provided with the flange 12 or reduced part 12b by a reamer or in any suitable manner. Then the shot or mass of lead, solder or suitable alloy is placed in the mid-part of the sleeve; and then the sleeve is inwardly pressed at the mid-part of the sleeve 10 and the mass 15 to form the crimps 14 and press them into said mass to hold said mass in place, and to form shoulders to limit the inward movement of the wires to be connected. Then the charge of flux material of hardened or other consistency of cup-shape or other shape is placed against said mass and the wafer 18 of flux or other rupturable material is adhered over each open end of the sleeve to seal the sleeve against the entry of impurities.

To form the article of Fig. 9, the shot or mass of lead, solder or suitable alloy is placed in the receptacle against the wall 14c. Then the charge of flux material is inserted; and the wafer 18 is adhered over the open end of the receptacle.

The wafers 18 may be omitted if desired.

The invention claimed is:

1. In combination, a heat-conductive sleeve having an open end having an inturned flange substantially perpendicular to the axis of the sleeve and shaped to engage a conducting wire on all sides simultaneously; said sleeve having a shoulder remote from the flange; a solid mass

of meltable alloy in the sleeve against said shoulder; and an outwardly open cup-shaped charge of hardened flux material fitting in the sleeve with its bottom wall against said mass, and having a thin cup wall as thick as the flange is high substantially from end to end and approximately as long as the cup diameter, fitting against the inner face of the sleeve and flange and extending into the sleeve a distance as great as two thirds the interval from the flange to the shoulder, to align the wire with the sleeve and hold the wire spaced from the sleeve and protect the sleeve and a wire fitted against said bottom from oxidation throughout said distance before and after the flux is melted; whereby the sleeve may be heated to melt the flux before the alloy is melted to cause the melted flux to simultaneously cover and flux well the inner face of the sleeve and the wire throughout said distance after the flux is melted to allow the conducting means to be pushed inwardly to said shoulder means while flux and alloy are held in by the flange in any position of the sleeve until the alloy pushes out the flux and impurities, if any, and becomes hardened and engages the perpendicular part of the flange.

2. An article of manufacture and sale comprising a preassembled ready-to-use connector comprising a heat-conductive sleeve of high melting point open at least at one end and there having an inturned flange substantially perpendicular to the sleeve and of a size to engage, on all sides simultaneously, a conducting wire to be secured by the connector; said sleeve having an interior shoulder remote from and facing the flange; a solid mass of meltable alloy in the sleeve against said shoulder and of lower melting point than the sleeve; and an outwardly open pre-formed cup-shaped charge of hardened flux material fitting in the sleeve with its bottom wall against said mass, and having a thin side wall as thin throughout as the flange is high and forming and providing an axially elongated empty cylindrical receptacle approximately as long as the sleeve diameter and into which said wire may be later quickly easily inserted and fitted for later soldering in the sleeve when, on the application of heat said side wall throughout its length quickly fluxes well an equal length of the sleeve and wire; said side wall of the pre-formed hardened charge being engaged by the flange to hold the charge from slipping out from the sleeve during shipping and sale while the flux is still hard, said side wall fitting against and protecting from oxidation the inner face of the sleeve adjacent to the empty receptacle between the time of manufacture and the later insertion of the wire for soldering in the sleeve.

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